

SERIAL NO. 09/484,749

Cancel claims 9-33.

REMARKS

BUR means "built-up roofing".

U.S. Serial No. 09/759,043 is commonly owned.

Claims 1-8 were rejected under 35 U.S.C. 103 on Mirous in view of Marzocchi. The Examiner has indicated that Mirous discloses high tear strength glass mats having a resin binder modified by additives and cross-linking agents, and Marzocchi discloses the use of silanes for preparing a coating for glass fibers.

Applicant respectfully traverses the Examiner's rejection of claims 1-8, as amended herein, on the combination of cited references. Applicant can find no disclosure, teaching or suggestion in any of the references, either singly or in combination, which would make the present invention obvious to one skilled in the art.

In order to narrow the issues present herein, Applicant has amended claim 1 to recite that the adhesion modifier is applied to the surface of the glass mat and to further define the adhesion modifier. Claims 9-33 have been cancelled. The invention now is directed to glass fiber-mats coated with an adhesion modifier whose asphalt-coated hand sheets and asphalt roofing shingles containing such treated glass mats show substantial improvement in tear strength. In fact, such asphalt shingles have a tear strength of about 2207 in gf which is substantially in excess of the 1700 required by the ASTM standard for commercial asphalt-roofing shingles.

While the reason for the unexpected effect is not completely understood at present, it is observed (Figs. 1 and 2) that such adhesion modifier-treated, asphalt-impregnated glass mats feature a tear region in which the fibers are pulled out, not torn or broken, which enhances its tear strength.

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Considering the references, it is seen that Mirous is directed only to a process of making the glass fiber mats themselves, which require a binder to hold the mat together. Usually the binder is a urea-formaldehyde resin. Mirous, however, discovered that by adding water-insoluble anionic phosphate esters to the urea-formaldehyde resin, high tear strength mats per se could be prepared. Clearly, Mirous does not disclose, teach or suggest the adhesion modifier of the present invention, which is applied to the surface of the glass mat and which promotes tear strength in an asphalt-impregnated glass mat. Stated another way, the present invention begins where the Mirous process of binding the glass fibers left off. Specifically, in this invention, the glass fiber mat is coated with the adhesion modifier, suitably from a solution or emulsion which is applied, preferably by spraying or dipping, onto the wet or dry mat before curing.

Marzocchi describes a composition for use in treatment of glass fibers to provide a more secure bonding relationship between glass fibers and elastomeric materials in the manufacture of glass fiber-reinforced elastomeric products. This composition is a resorcinol-aldehyde resin prepared by reacting resorcinol and an aldehyde in the presence of an amino silane, silanol or polysiloxane. Accordingly, the disclosure relates to the preparation of a new resin which has an organo-silicon compound chemically bonded to the resorcinol-aldehyde matrix. Of course, such organo-silicon compounds must be reactive enough to enter chemically into such matrix. Preferred are silanes having a readily hydrolysable group. These actives could not be suitable as adhesion modifiers in this invention.

In contrast, the adhesion modifiers useful in applicants' invention are not incorporated in the resin nor are they reactive, or intended to be reactive, with any elastomeric material. Quite the contrary, the adhesion promoters of this invention are applied to the surface of the glass mats and are non-reactive with the glass mats and the asphalt-impregnated into the mats. They demote physical adhesion between mat and asphalt so that the fibers are pulled out, not torn.

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In view of the foregoing, the claims as amended are believed to define invention over the cited art. Reconsideration and early allowance is respectfully solicited.

Respectfully submitted,



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May 14, 2002

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AMENDMENT TO THE CLAIMS IN MARKED-UP VERSION IN ANSWER TO
EXAMINER'S ACTION MAILED 02/15/2002.

Claim 1. (Amended) A glass fiber mat for use in a roofing composite, said mat comprising, by weight, about 68% to about 90% of fibers; about 10% to about 32% by weight of an organic resin binder; and having applied to the surface of said glass mat about 0.001% to about 20% by weight of an adhesion modifier which induces fiber pull-out during tear of the composite and provides improved composite tear strength and wherein said adhesion modifier is selected from the group consisting of siloxanes, glycerides, phosphate esters of fatty acids or alcohols, fatty ammonium salts, saponified oils, coconut oil, polyamines, fatty amines, fatty amine oxides, amido amines, polyamido amines, amine substituted terpenes, polyamides and mixtures of the above with glycerols or glycols.